AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A method jetting liquid droplets, comprising the steps of:

providing a liquid jetting head which includes: a plurality of nozzle orifices; a plurality of pressure generation chambers associated with the nozzle orifices; and a plurality of piezoelectric vibrators for respectively varying the volume of the associated pressure generation chamber to jet a liquid droplet from the associated nozzle orifice;

providing ID data for identifying the respective nozzle orifices;

providing a reference drive signal to instruct the piezoelectric vibrator to jet a reference liquid droplet having a designated amount from the nozzle orifice;

applying the reference drive signal to the respective piezoelectric vibrators to jet liquid droplet from the nozzle orifices;

measuring amounts of the respective liquid droplets jetted from the respective identified nozzle orifices by the reference drive signal;

identifying a difference between the designated amount and the measured amount of each liquid droplet;

providing correction data for reducing the difference so that the designated amount is jetted from the nozzle orifice;

associating the correction data with the respective nozzle orifices identified by the ID data;

storing the associated correction data;

providing a plurality of serial drive signals for driving the piezoelectric vibrators to jet liquid droplets from the nozzles;

selecting at least one drive signal from the plurality of serial drive signals to adjust a displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifice, based on the associated correction data; and

applying the selected drive signal to the piezoelectric vibrators.

2. (previously presented): The liquid jetting method as set forth in claim 1,

wherein the at least one drive signal within a single jetting cycle of the jetting head is selected in the selecting step; and

wherein the plurality of drive signals respectively have different liquid jetting energy from each other.

3. (previously presented): A method of jetting liquid droplets, comprising the steps of:

providing a liquid jetting head which includes: a plurality of nozzle orifices; a plurality of pressure generation chambers associated with the nozzle orifices; and a plurality of piezoelectric

vibrators for respectively varying the volume of the associated pressure generation chamber to jet a liquid droplet from the associated nozzle orifice;

setting a single jetting cycle as a period in which N serial drive signals are applicable to the piezoelectric vibrators to jet liquid droplets from the nozzle orifices, N being an integer;

providing ID data for identifying the respective nozzle orifices;

providing a reference drive signal to instruct the piezoelectric vibrator to jet a reference liquid droplet having a designated amount from the nozzle orifice;

applying the reference drive signal to the respective piezoelectric vibrators to jet liquid droplets from the nozzle orifices;

measuring amounts of the respective liquid droplets jetted from the respective identified nozzle orifices by the reference drive signal;

identifying a difference between the designated amount and the measured amount of each liquid droplet;

providing correction data for reducing the difference so that the designated amount is jetted from the nozzle orifice;

associating the correction data with the respective nozzle orifices identified by the ID data; and

storing the associated correction data;

selecting M drive signals from the N serial drive signals based on the associated correction data, M being an integer which is equal to or less than N, where $N > 1$; and

applying the M drive signals to the piezoelectric vibrators within the single jetting cycle.

4. (original): The liquid jetting method as set forth in claim 3, wherein the selected drive signals are applied at different intervals within the single jetting cycle.

5. (previously presented): The liquid jetting method as set forth in claim 4, wherein the intervals are determined such that a phase of residual vibration of a meniscus of the liquid in the nozzle orifice is adjusted due to jetting by a preceding drive signal.

6. (previously presented): A liquid jetting apparatus, comprising:

a liquid jetting head including: a plurality of nozzle orifices; a plurality of pressure generation chambers associated with the nozzle orifices; and a plurality of piezoelectric vibrators for respectively varying the volume of the associated pressure generation chamber to jet a liquid droplet from the associated nozzle orifice;

a drive signal generator, for generating a plurality of serial drive signals, respectively driving the piezoelectric vibrators, within a single jetting cycle of the liquid jetting head;

an ID data storage, for storing ID data which identifies the respective nozzle orifices;

a reference drive signal generator, for generating a reference drive signal to instruct the piezoelectric vibrator to jet a reference liquid droplet having a designated amount from the nozzle orifice;

a reference drive signal applier, for applying the reference drive signal to the respective piezoelectric vibrators to jet liquid droplet from the nozzle orifices;

an identifier, for measuring amounts of the respective liquid droplets jetted from the respective identified nozzle orifices by the reference drive signal, and identifying a difference between the designated amount and the measured amount of each liquid droplet;

a correction data storage, for storing correction data which reduces the difference so that the designated amount is jetted from the nozzle orifice, and the correction data associated with the respective nozzle orifices identified by the ID data; and

a drive signal supplier, for selecting at least one drive signal from the serial drive signals to adjust a displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifice, based on the associated correction data.

7. (original): The liquid jetting apparatus as set forth in claim 6, wherein the drive signal supplier selects at least two drive signals from the plural drive signals.

8. (previously presented): A liquid jetting apparatus, comprising:

a liquid jetting head including: a plurality of nozzle orifices; a plurality of pressure generation chambers associated with the nozzle orifices; and a plurality of piezoelectric vibrators for respectively varying the volume of the associated pressure generation chamber to jet a liquid droplet from the associated nozzle orifices;

at least one drive signal generator, for generating N serial drive signals, respectively driving the piezoelectric vibrators, within a single jetting cycle of the liquid jetting head, N being an integer which is not less than 3;

an ID data storage, for storing ID data which identifies the respective nozzle orifices;

a reference drive signal generator, for generating a reference drive signal to instruct the piezoelectric vibrator to jet a reference liquid droplet having a designated amount from the nozzle orifice;

a reference drive signal applier, for applying the reference drive signal to the respective piezoelectric vibrators to jet liquid droplets from the nozzle orifices;

an identifier, for measuring amounts of the respective liquid droplets jetted from the respective identified nozzle orifices by the reference drive signal, and identifying a difference between the designated amount and the measured amount of each liquid droplet;

a correction data storage, for storing correction data which reduces the difference so that the designated amount is jetted from the nozzle orifice, and the correction data associated with the respective nozzle orifices identified by the ID data; and

a drive signal supplier, for identifying a nozzle orifice in which the jetting amount is to be corrected, through use of the ID data, and selecting M drive signals from the N serial drive signals to adjust a displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifice, based on the associated correction data, M being an integer which is equal to or less than N.

9. (original): The liquid jetting apparatus as set forth in claim 8, wherein the selected drive signals are applied at different intervals within the single jetting cycle.

10. (original): The liquid jetting apparatus as set forth in claim 8, wherein the single jetting cycle is determined as a period which is enough to substantially damp residual vibration of a meniscus of the liquid in the nozzle orifice due to jetting by the last drive signal within the single jetting cycle.

11. (original): The liquid jetting apparatus as set forth in claim 8, wherein a plurality of drive signal generators are provided such that different drive signals are generated from the respective drive signal generators.

12. (currently amended): A method jetting liquid droplets, comprising the steps of:

providing a liquid jetting head which includes: a plurality of nozzle orifices; a plurality of pressure generation chambers associated with the nozzle orifices; and a plurality of piezoelectric vibrators for respectively varying the volume of the associated pressure generation chamber to jet a liquid droplet from the associated nozzle orifice;

providing ID data for identifying the respective nozzle orifices;

providing a reference drive signal which is applied to the piezoelectric vibrator such that a reference liquid droplet having a designated amount is jetted from the nozzle orifice;

applying the reference drive signal to the respective piezoelectric vibrators to jet liquid droplet from the nozzle orifices, wherein a plurality of drive signals for driving the piezoelectric vibrators to jet liquid droplets from the nozzle orifices is provided, the drive signals respectively having different liquid jetting energy from each other, and wherein at least one drive signal

within a single jetting cycle of the jetting head is selected and applied to the piezoelectric vibrator;

measuring amounts of the respective liquid droplets jetted by the reference drive signal;

identifying a difference between the designated amount and the measured amount of each liquid droplet, wherein volume differences among the liquid droplets ejected by the respective drive signals ~~can be~~are divided by a volume of a liquid droplet which is the minimum volume jetted by one drive signal;

providing correction data for reducing the difference; and

adjusting a displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifice, based on the correction data.

13. (original): The liquid jetting method as set forth in claim 1, further comprising the step of identifying a nozzle orifice in which the jetting amount is to be corrected, through use of the ID data.

14. (original): The liquid jetting method as set forth in claim 3, further comprising the step of identifying a nozzle orifice in which the jetting amount is to be corrected, through use of the ID data.

15. (original): The liquid jetting apparatus as set forth in claim 6, wherein the drive signal supplier identifies a nozzle orifice in which the jetting amount is to be corrected, through use of the ID data.

16. (previously presented): The liquid jetting method as set forth in claim 1, wherein the identified nozzle orifice ejects the liquid in accordance with the displacement behavior of the piezoelectric vibrator when the identified nozzle orifice receives print data.

17. (previously presented): The liquid jetting method as set forth in claim 3, wherein the identified nozzle orifice ejects the liquid in accordance with a displacement behavior of the piezoelectric vibrator when the identified nozzle orifice receives print data.

18. (previously presented): The liquid jetting apparatus as set forth in claim 6, wherein the identified nozzle orifice is operably configured to eject liquid in accordance with the displacement behavior of the piezoelectric vibrator when the identified nozzle orifice receives print data.

19. (previously presented): The liquid jetting apparatus as set forth in claim 8, wherein the identified nozzle orifice is operably configured to eject liquid in accordance with the displacement behavior of the piezoelectric vibrator when the identified nozzle orifice receives print data.

20. (currently amended): A liquid jetting method, comprising:

providing a liquid jetting head which includes: a plurality of nozzle orifices; a plurality of pressure generation chambers associated with the nozzle orifices; and a plurality of piezoelectric vibrators for respectively varying the volume of the associated pressure generation chamber to jet a liquid droplet from the associated nozzle orifice;

providing ID data for identifying the respective nozzle orifices;

providing a reference drive signal which is applied to the piezoelectric vibrator such that a reference liquid droplet having a designated amount is jetted from the nozzle orifice;

applying the reference drive signal to the respective piezoelectric vibrators to jet liquid droplet from the nozzle orifices;

measuring amounts of the respective liquid droplets jetted from the respective identified nozzle orifices by the reference drive signal;

identifying a difference between the designated amount and the measured amount of each liquid droplet;

providing correction data for reducing the difference;

associating the correction data with the respective nozzle orifices identified by the ID data;

storing the associated correction data;

adjusting a displacement behavior of a piezoelectric vibrator associated with the identified nozzle orifice, based on the associated correction data;

providing a plurality of drive signals for driving the piezoelectric vibrators to jet liquid droplets from the nozzle orifices, the drive signals respectively having different liquid jetting energy from each other;

selecting at least one drive signal within a single jetting cycle of the jetting head; and

applying the selected drive signal to the piezoelectric vibrators,

wherein volume differences among the liquid droplets ejected by the respective drive signals ~~can be~~are divided by a volume of a liquid droplet which is the minimum volume jetted by one single drive signal.

21. (previously presented): The liquid jetting method as set forth in claim 3, wherein the serial drive signals respectively have different liquid jetting energy from each other.

22. (previously presented): The liquid jetting method as set forth in claim 6, wherein the serial drive signals respectively have different liquid jetting energy from each other.

23. (previously presented): The liquid jetting method as set forth in claim 8, wherein the serial drive signals respectively have different liquid jetting energy from each other.

24. (previously presented): The liquid jetting method as set forth in claim 1, wherein the selected serial drive signals are applied at different intervals within the single jetting cycle.

25. (previously presented): The liquid jetting method as set forth in claim 6, wherein the selected serial drive signals are applied at different intervals within the single jetting cycle.

26. (previously presented): The liquid jetting method as set forth in claim 24, wherein the intervals are determined such that a phase of residual vibration of a meniscus of the liquid in the nozzle orifice is adjusted due to jetting by a preceding drive signal.

27. (previously presented): The liquid jetting method as set forth in claim 25, wherein the intervals are determined such that a phase of residual vibration of a meniscus of the liquid in the nozzle orifice is adjusted due to jetting by a preceding drive signal.

28. (previously presented): The liquid jetting method as set forth in claim 9, wherein the intervals are determined such that a phase of residual vibration of a meniscus of the liquid in the nozzle orifice is adjusted due to jetting by a preceding drive signal.